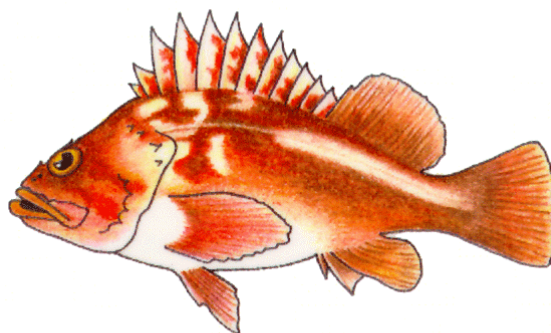


Copper Rockfish, *Sebastes caurinus*

1993-1999 Commercial Catch by Ports & Blocks



Marine Fishery Profiles

Volume 1: Nearshore

Marine Region GIS Lab

Nancy Wright	Eric Knaggs
Jamie Kum	Bob Leos
Chad King	Colleena Perez



California Department of Fish & Game
Marine Region

December 2000

Santa Barbara



Catch - 199,810 lbs.



Revenue - \$264,558



Port Cities



Catch by Pounds



Revenue



Effort - Pounds per Trip



10 Nautical Mile Port Buffers



50 Meter Contour Lines
out to 600 Meters Depth



Copper Rockfish - Broadest Range
(0 - 185 Meters Depth)



Copper Rockfish - Common Adult Range
(0 - 120 Meters Depth)



Copper Rockfish - Juvenile Range
(0 - 5 Meters Depth)



1 Nautical Mile Coastline Buffer



40 Fathom Contour Line

Map based on 1993-1999 PacFIN data (ports), & 1993-1999 California Department of Fish & Game Commercial Landing Receipts (blocks).

Copper Rockfish, 1993-1999
Commercial Market
Catch by Block (lbs.)



24,000 - 32,000



16,000 - 24,000



7,900 - 16,000



100 - 7,900

Port of Los Angeles

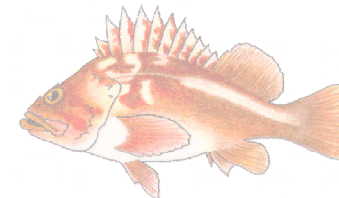


Catch - 20,562 lbs.



Revenue - \$26,500

Southern California



Copper Rockfish, *Sebastes caurinus*
1993-1999 Commercial Catch by Ports & by Block
California Department of Fish & Game

San Diego

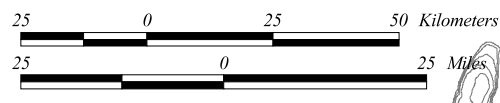


Catch - 1,015 lbs.

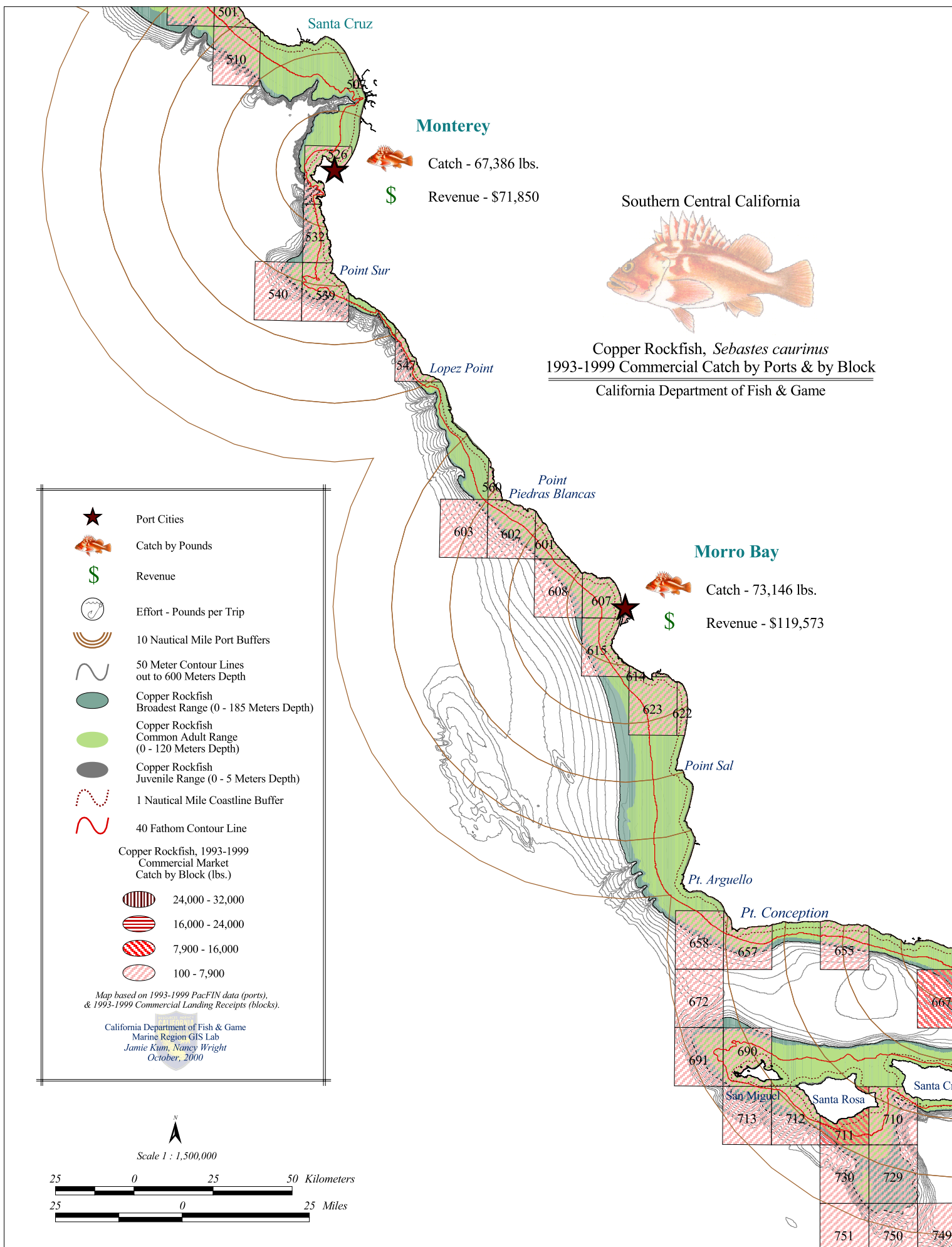


Revenue - \$1,083

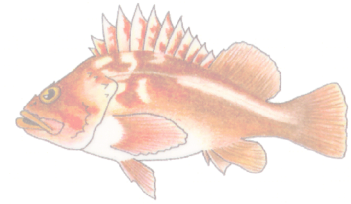
Scale 1 : 1,500,000



California Department of Fish & Game
Marine Region GIS Lab
Jamie Kum, Nancy Wright
October, 2000



Northern Central California



Copper Rockfish, *Sebastes caurinus*
1993-1999 Commercial Catch by Ports & by Block
California Department of Fish & Game

Bodega Bay



Catch - 59,865 lbs.



Revenue - \$81,583

San Francisco



Catch - 100,682 lbs.



Revenue - \$146,923

Half Moon Bay

Santa Cruz

Monterey



Catch - 67,386 lbs.



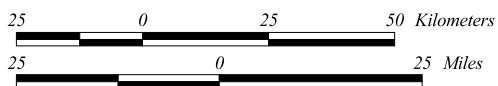
Revenue - \$71,850

- ★ Port Cities
- Catch by Pounds
- \$ Revenue
- Effort - Pounds per Trip
- 10 Nautical Mile Port Buffers
- 50 Meter Contour Lines out to 600 Meters Depth
- Copper Rockfish Broadest Range (0 - 185 Meters Depth)
- Copper Rockfish Common Adult Range (0 - 120 Meters Depth)
- Copper Rockfish Juvenile Range (0 - 5 Meters Depth)
- 1 Nautical Mile Coastline Buffer
- 40 Fathom Contour Line
- Copper Rockfish, 1993-1999 Commercial Market Catch by Block (lbs.)
 - 24,000 - 32,000
 - 16,000 - 24,000
 - 7,900 - 16,000
 - 100 - 7,900

Map based on 1993-1999 PacFIN data (ports),
& 1993-1999 Commercial Landing Receipts (blocks).

California Department of Fish & Game
Marine Region GIS Lab
Jamie Kum, Nancy Wright
October, 2000

Scale 1 : 1,500,000



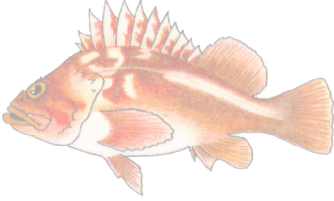
Point
Piedras Blancas

Lopez Point

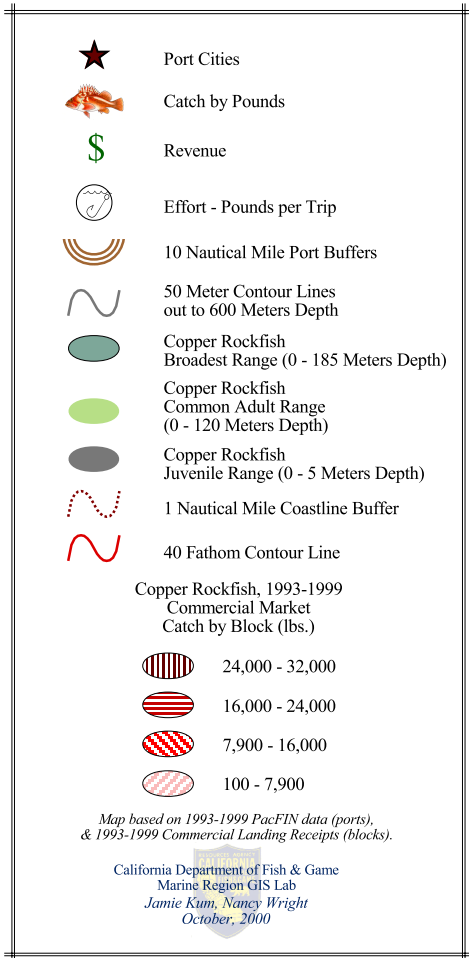
Point Sur

Point Año Nuevo

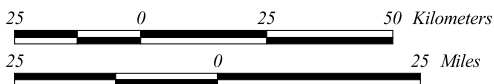
Northern California



Copper Rockfish, *Sebastes caurinus* 1993-1999 Commercial Catch by Ports & by Block California Department of Fish & Game



Scale 1 : 1,500,000



Crescent City



Catch - 56,285 lbs.



Revenue - \$60,539

Eureka



Catch - 80,385 lbs.



Revenue - \$80,774

Cape Mendocino

Punta Gorda

Fort Bragg



Catch - 150,281 lbs.



Revenue - \$140,452

Point Arena

Figure 1. (refer to table 1) CDFG Commercial Receipts Data (1993 - 1999)
Total Pounds of Copper Rockfish Caught and Average Price per Pound by Month

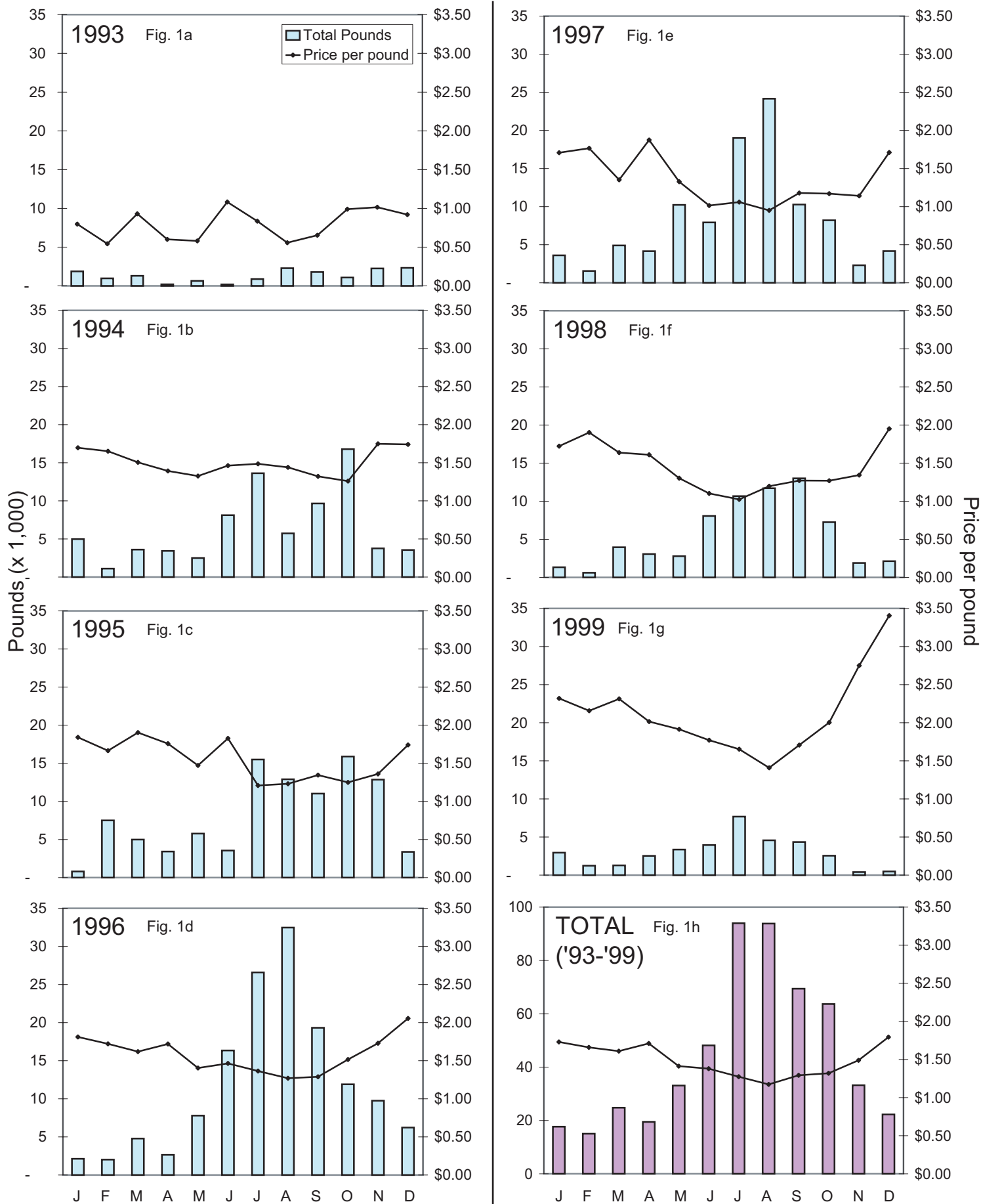


Table 1. (refer to fig. 1) CDFG Commercial Receipts Data (1993 - 1999)
Total Pounds of Copper Rockfish Caught and Average Price per Pound by Month

1993
Table 1a

Month	Total Pounds	Price per Pound
Jan	1,867	\$0.80
Feb	975	\$0.54
Mar	1,304	\$0.93
Apr	205	\$0.60
May	649	\$0.58
Jun	191	\$1.08
Jul	882	\$0.84
Aug	2,289	\$0.56
Sep	1,788	\$0.65
Oct	1,084	\$0.99
Nov	2,248	\$1.01
Dec	2,325	\$0.92
Total	15,804	\$0.80

1997
Table 1e

Month	Total Pounds	Price per Pound
Jan	3,600	\$1.71
Feb	1,550	\$1.77
Mar	4,899	\$1.35
Apr	4,151	\$1.87
May	10,225	\$1.33
Jun	7,926	\$1.01
Jul	19,003	\$1.06
Aug	24,161	\$0.95
Sep	10,274	\$1.18
Oct	8,207	\$1.17
Nov	2,296	\$1.14
Dec	4,165	\$1.71
Total	100,456	\$1.19

1994
Table 1b

Month	Total Pounds	Price per Pound
Jan	4,973	\$1.70
Feb	1,112	\$1.65
Mar	3,599	\$1.50
Apr	3,425	\$1.39
May	2,499	\$1.33
Jun	8,115	\$1.46
Jul	13,619	\$1.49
Aug	5,732	\$1.44
Sep	9,652	\$1.32
Oct	16,790	\$1.26
Nov	3,769	\$1.75
Dec	3,546	\$1.74
Total	76,832	\$1.44

1998
Table 1f

Month	Total Pounds	Price per Pound
Jan	1,338	\$1.72
Feb	611	\$1.90
Mar	3,952	\$1.64
Apr	3,066	\$1.61
May	2,782	\$1.30
Jun	8,069	\$1.10
Jul	10,671	\$1.02
Aug	11,698	\$1.20
Sep	12,997	\$1.27
Oct	7,246	\$1.27
Nov	1,896	\$1.34
Dec	2,131	\$1.95
Total	66,457	\$1.27

1995
Table 1c

Month	Total Pounds	Price per Pound
Jan	803	\$1.84
Feb	7,509	\$1.67
Mar	4,986	\$1.90
Apr	3,424	\$1.76
May	5,772	\$1.47
Jun	3,546	\$1.83
Jul	15,495	\$1.21
Aug	12,908	\$1.23
Sep	11,018	\$1.35
Oct	15,895	\$1.25
Nov	12,859	\$1.36
Dec	3,374	\$1.74
Total	97,591	\$1.41

1999
Table 1g

Month	Total Pounds	Price per Pound
Jan	2,944	\$2.32
Feb	1,237	\$2.16
Mar	1,274	\$2.31
Apr	2,524	\$2.01
May	3,352	\$1.91
Jun	3,947	\$1.77
Jul	7,682	\$1.65
Aug	4,569	\$1.41
Sep	4,346	\$1.71
Oct	2,544	\$2.00
Nov	393	\$2.75
Dec	487	\$3.41
Total	35,299	\$1.85

1996
Table 1d

Month	Total Pounds	Price per Pound
Jan	2,133	\$1.81
Feb	2,023	\$1.72
Mar	4,783	\$1.62
Apr	2,648	\$1.72
May	7,797	\$1.40
Jun	16,345	\$1.46
Jul	26,591	\$1.36
Aug	32,469	\$1.27
Sep	19,324	\$1.29
Oct	11,902	\$1.52
Nov	9,748	\$1.73
Dec	6,226	\$2.06
Total	141,988	\$1.44

TOTAL
'93 - '99
Table 1h

Month	Total Pounds	Price per Pound
Jan	17,659	\$1.73
Feb	15,016	\$1.66
Mar	24,796	\$1.61
Apr	19,443	\$1.71
May	33,075	\$1.41
Jun	48,139	\$1.38
Jul	93,943	\$1.27
Aug	93,826	\$1.17
Sep	69,398	\$1.29
Oct	63,668	\$1.32
Nov	33,209	\$1.49
Dec	22,254	\$1.79
Total	534,426	\$1.37

Figure 2. (refer to table 2) Pacific Fisheries Information Network Data (1993 - 1999)
Total Pounds of Copper Rockfish Caught and Average Price per Pound by Month

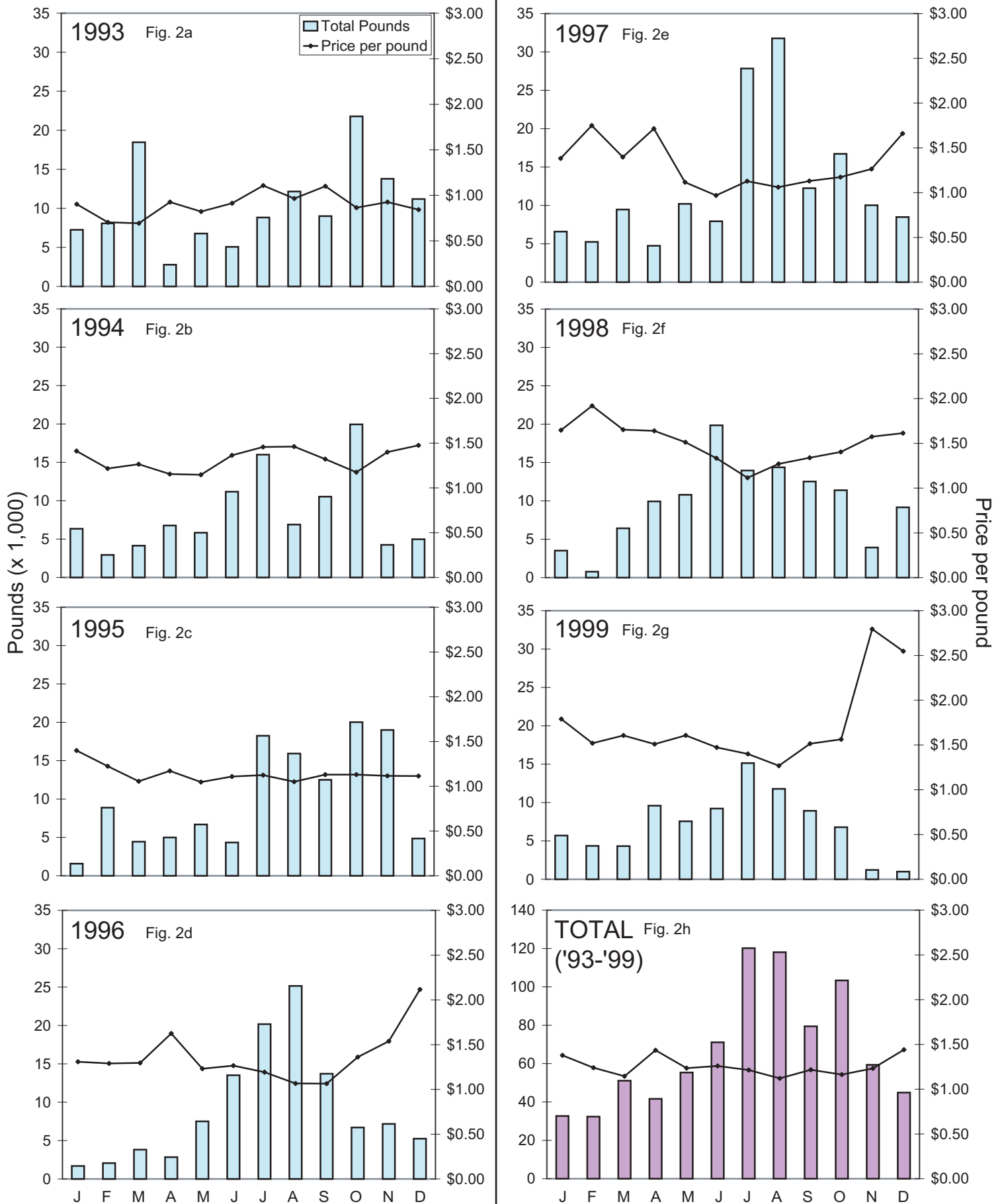


Table 2. (refer to fig. 2) Pacific Coast Fisheries Information Network Data (1993 - 1999)
Total Pounds of Copper Rockfish Caught and Average Price per Pound by Month

1993
Table 2a

Month	Total Pounds	Price per Pound
Jan	7,250	\$0.90
Feb	8,072	\$0.70
Mar	18,472	\$0.69
Apr	2,781	\$0.93
May	6,773	\$0.82
Jun	5,068	\$0.91
Jul	8,830	\$1.11
Aug	12,161	\$0.96
Sep	9,005	\$1.10
Oct	21,786	\$0.86
Nov	13,780	\$0.93
Dec	11,195	\$0.84
Total	125,173	\$0.88

1997
Table 2e

Month	Total Pounds	Price per Pound
Jan	6,590	\$1.38
Feb	5,247	\$1.75
Mar	9,458	\$1.40
Apr	4,746	\$1.71
May	10,203	\$1.12
Jun	7,938	\$0.97
Jul	27,839	\$1.13
Aug	31,772	\$1.06
Sep	12,250	\$1.13
Oct	16,719	\$1.17
Nov	10,020	\$1.26
Dec	8,487	\$1.66
Total	151,269	\$1.22

1994
Table 2b

Month	Total Pounds	Price per Pound
Jan	6,348	\$1.41
Feb	2,933	\$1.22
Mar	4,143	\$1.26
Apr	6,765	\$1.15
May	5,827	\$1.15
Jun	11,169	\$1.36
Jul	16,001	\$1.46
Aug	6,895	\$1.46
Sep	10,526	\$1.32
Oct	19,950	\$1.18
Nov	4,251	\$1.40
Dec	4,981	\$1.48
Total	99,789	\$1.32

1998
Table 2f

Month	Total Pounds	Price per Pound
Jan	3,518	\$1.65
Feb	779	\$1.92
Mar	6,430	\$1.65
Apr	9,940	\$1.64
May	10,791	\$1.51
Jun	19,854	\$1.33
Jul	13,958	\$1.12
Aug	14,377	\$1.27
Sep	12,526	\$1.34
Oct	11,384	\$1.40
Nov	3,925	\$1.57
Dec	9,163	\$1.61
Total	116,645	\$1.41

1995
Table 2c

Month	Total Pounds	Price per Pound
Jan	1,583	\$1.40
Feb	8,879	\$1.22
Mar	4,443	\$1.06
Apr	4,985	\$1.17
May	6,690	\$1.05
Jun	4,340	\$1.11
Jul	18,246	\$1.12
Aug	15,924	\$1.05
Sep	12,509	\$1.13
Oct	20,017	\$1.13
Nov	19,004	\$1.12
Dec	4,857	\$1.11
Total	121,477	\$1.12

1999
Table 2g

Month	Total Pounds	Price per Pound
Jan	5,694	\$1.79
Feb	4,357	\$1.52
Mar	4,321	\$1.61
Apr	9,589	\$1.51
May	7,562	\$1.61
Jun	9,220	\$1.47
Jul	15,136	\$1.40
Aug	11,788	\$1.27
Sep	8,923	\$1.51
Oct	6,790	\$1.56
Nov	1,215	\$2.79
Dec	997	\$2.55
Total	85,592	\$1.52

1996
Table 2d

Month	Total Pounds	Price per Pound
Jan	1,686	\$1.31
Feb	2,067	\$1.29
Mar	3,821	\$1.30
Apr	2,839	\$1.63
May	7,504	\$1.23
Jun	13,520	\$1.27
Jul	20,175	\$1.19
Aug	25,151	\$1.07
Sep	13,705	\$1.06
Oct	6,709	\$1.36
Nov	7,167	\$1.54
Dec	5,242	\$2.12
Total	109,586	\$1.25

TOTAL
'93 - '99
Table 2h

Month	Total Pounds	Price per Pound
Jan	32,669	\$1.38
Feb	32,334	\$1.24
Mar	51,088	\$1.14
Apr	41,645	\$1.43
May	55,350	\$1.24
Jun	71,109	\$1.26
Jul	120,185	\$1.21
Aug	118,068	\$1.12
Sep	79,444	\$1.22
Oct	103,355	\$1.16
Nov	59,362	\$1.23
Dec	44,922	\$1.44
Total	809,531	\$1.23

Abbreviated Life History of the Copper Rockfish (*Sebastes caurinus*)

The copper rockfish is a highly variable species in terms of coloration, and due to this characteristic has been known by several names, depending to some degree upon locality.

Distribution, Stock Structure and Migration

The copper rockfish is broadly distributed geographically, known from the northern Gulf of Alaska to off central Baja California. It also has a broad bathymetric distribution, known to occur from the shallow subtidal to 600 ft.

Tagging studies indicate that copper rockfish, for the most part, show little movement once they have settled to the bottom. Movement of up to one mile has been noted but the majority of tagged and recaptured copper rockfish are from the locality where they were originally taken. This life-history characteristic of high site fidelity makes this species susceptible to local depletion.

Age and Growth

Copper rockfish have been aged to 41 yr. Off central California, copper rockfish have been aged to 28 yr (a 22.1-in. individual). Size at age for copper rockfish, based on aging whole otoliths, from central California for the first 5 yr is as follows: age 0, to 3.6 in. TL; age 1, 3.7 to 5.9 in. TL; age 2, 4.2 to 9.4 in. TL; age 3, 7.0 to 11.5 in. TL; and age 4, 8.9 to 13.2 in. TL. There appears to be no significant difference in the growth rates between sexes. The maximum-recorded length for coppers is 22.8 inches.

Reproduction, Fecundity and Seasonality

Length at first maturity for males has been found to vary from 11.6 to 14.6 in. TL (3 to 8 yr, respectively), and for females 11.6 to 12.2 in. TL (approximately 5 yr). Length at 50% maturity for males has been documented at 12.6 in. (4 yr), and for females at 13.4 in. (6 yr); and 13.4 in. (6 yr) for a sex-unspecified fish.

As will all rockfishes, coppers are viviparous and highly fecund. Mating occurs in the fall, and in California, larvae are released during winter months (Jan.-Apr.) with a peak in February. Larval duration was found to be one to two months. Young-of-the-year copper rockfish recruit into the nearshore environment at about 0.8 to 1.0 in. during April and May off central California.

Natural Mortality	Calculations of natural mortality (M) have been made from populations in Puget Sound, Washington and was calculated to be 0.1127 using tag/recapture method on fish 5 to 34 yr old.
Diseases	No information is available on diseases in copper rockfish.
Predator/Prey Relationships	<p>Copper rockfish feed on a wide variety of prey items. Juvenile copper rockfish feed primarily on planktonic crustaceans. Larger crustaceans form a major part of their diet as they grow; these include <i>Cancer</i> sp. crabs, kelp crabs, and shrimps. Squid of the genus <i>Loligo</i> and octopi are also important food items. Fishes, which include young-of-the-year rockfishes, cusk-eels, eelpouts, and sculpins, are important forage for larger individuals.</p> <p>As juveniles and adults, copper rockfish are preyed upon by a variety of fishes including other rockfishes, lingcod, cabezon and salmon as well as several species of birds and mammals.</p>
Competition	<p>No information on competition in copper rockfish was found. Due to their co-occurrence with other larger benthic fish species such as cabezon, lingcod, greenlings, and rockfishes such as vermilion, brown, China, and gopher, it is likely that some degree of competition for food and space may occur.</p>
Critical Habitat	<p>Newly recruited copper rockfish initially associate with surface-forming kelps. After several months, and at about 1.6 in., the juveniles settle to the bottom on rocky reefs as well as sandy areas and are referred to as benthic juveniles. Adults are commonly found in kelp bed areas but also frequent deeper rocky reefs. As adults, this species is considered to be epibenthic, normally occurring slightly above the substrate, which is often high-relief rocky shelf and rock-sand interface.</p> <p>Copper rockfish are an important component of the nearshore rocky reef system and are frequently encountered by scuba divers in this environment. Submersible observations of the biotic community off the Big Sur coast revealed copper rockfish between depths of 72 to 322 ft. The majority of sightings were of individual (solitary) fish occurring over rocky reef or boulder fields and most frequently in areas of high relief. Occasionally an individual was observed over sand.</p>

Status of Stocks

There has been no stock assessment of this species in California. However, there is compelling evidence that copper rockfish populations have severely declined in many areas and large individuals are noticeably less common than in past decades.

Copper rockfish is one of the species taken in the commercial live-fish fishery. Copper rockfish have been an important component of the recreational catch in both skiff and commercial passenger fishing vessel (CPFV) fisheries, especially off central and northern California. Due to its relatively large size, copper rockfish have been considered one of the premium species in the recreational angler's catch and a prime target for the sport diver. Due to their solitary nature, high habitat specificity, and the size they can enter the fishery (as juveniles), the copper rockfish is a prime candidate for local depletion.